ROCKS and MINERALS

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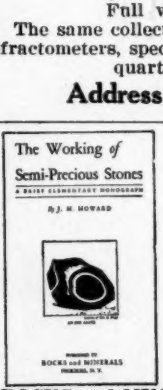

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ROCKS and MINERALS

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The Official Journal of the Rocks and Minerals Association

MAY 1935

VOL. 10, No. 5

WHOLE No. 47

The Geologic-Making of Alabama*

By R. S. POOR, Ph. D.

Head Department Geology, Birmingham-Southern College, Birmingham, Ala.

I wish to invite your attention to that part of the United States, Alabama in particular, as it has existed during the eons of time generally referred to as Geologic time. As a matter of fact all time is Geologic time because students of Geology do not recognize that there has been any very notable differences in Geologic processes as they are recorded in the rocks formed many, many years ago and those of the present day. I think it is a common fallacy on the part of most pseudo-scientific novices which sometimes reach popular attention through the press and over the air that those effects referred to as occurring in Geologic time were weird, strange and mysterious in the extreme. This is not so. Very rare indeed are the events introduced here as having happened in those bygone ages which cannot almost be exactly duplicated today. To be sure the magnitude of some of these events has in some cases exceeded our experience but nevertheless I wish to clarify and withdraw any apprehensive notion that you may have concerning the so-called mystery of those bygone days. Is it not a more logical conclusion to assume that past events have been orderly the same as now; because we observe on every hand distinct evidence of law and order? So the story that I want to tell you iminates from one who has convinced himself, at least, that the physical features of the Creator's handiwork which we find on the surface of our earth is merely the present stage of a long, ceaseless, ever changing series of events. The problem as defined in its broader aspects is beyond the comprehension of any one person and if I were able I could treat only a portion of it in the time allotted to me. I am, therefore, limiting myself to those events which concern Alabama and I am attempting to discuss other areas only very briefly and then only in-so-far as they affect the geologic history of Alabama.

The General Aspects of the Problem

The earliest known record of eastern United States is recorded in those highly crystalline, more or less enigmatic rocks, which have been assigned to that era of earth history known as the Pre-Cambrian. In these rocks we find the gold deposits, the marble and graphite deposits of Alabama. The story of the formation of these economic products necessarily is much abbreviated but suffice it to say that the high temperatures and high pressures which accompanied the formation of these so-called igneous rocks in which these minerals are contained is considered to be a necessary prerequisite to their formation. If time permits we shall return to some of the details concerning their origin.

The Pre-Cambrian rocks referred to above occur at the surface in Alabama only in the East-Central part of the state and as I said before they extend

*Address given before the Alabama Junior Academy of Science, Spring Hill College, Mobile, Ala., March 10th, 1934.

under the entire Coastal Plain. In the northern one-third of the state we find the valley and ridge section, lying adjacent to the Pre-Cambrian rocks, and extending in a northeast-southwest direction. The rocks composing these mountainous ridges and the intervening valleys and the more level portions of the state to the north and west are composed exclusively of sedimentary rocks and belong to that portion of earth history known as the Paleozoic Era. The southern one-half of the state and a portion along the western margin is underlain by rocks belonging to the Mesozoic and Cenozoic Eras. Mobile is located at the southern most limit of these Cenozoic rocks, the youngest rocks in Alabama.

Paleozoic History

I want you to visualize a picture of eastern United States at the beginning of the Paleozoic Era. (Allow me to digress for a moment to state that any statement made in this discussion will be subject to proof unless at times we find it necessary to draw upon some of the interesting theories which have been advanced. If this is done you will be amply warned beforehand). Picture first of all a high mountain ridge with elevations comparable to those of our present Rocky Mountains and extending from North America to possibly Cuba in a northeast-southwest direction. This mountain range, known as Old Appalachia, extended from the western edge of our present Piedmont Plateau eastward to a line, whose definite location has not been determined, but certainly 150 or more miles east of our present Atlantic coast line. Here then, we have a range of mountains which compare in size with almost any range in the world today with the possible exception of the Alps. They were composed of all kinds and varieties of rocks and subject to all the known geologic processes of erosion and rock decay.

Along the western margin of this high mountainous mass, extending from central Alabama to southern Newfoundland, there was a narrow canoe-shaped sea basin, known as the Appalachian Geosyncline. This sea was one very much like our present Gulf of California, or Hudson Bay, or, better still, the Red Sea. Its maximum width was probably 200 miles and its greatest depth is known to have been not greater than 600 feet.

There were two gate-ways to this narrow trough-like sea; one by way of the Gulf of the St. Lawrence and the other by the Gulf of Mexico. We are certain that this trough was constantly flooded but sometimes only very small lagoonal seas were present, while at other times the basin was more than filled. The record shows that the water advanced far into the interior of the United States on various occasions. This, then, is the physical set-up at the close of Paleozoic Era of geologic history. Note that there were no Appalachian mountains but a long sea arm where the mountains are now located; and that there was no Coastal Plain, at least not as we now know it; and the locality where Mobile is now situated had not yet come into existence.

Obviously, such a topography as that pictured above would be subject to considerable rapid erosion. Therefore we may picture numerous high velocity streams carrying large amounts of debris off of Old Appalachia in either direction from the main water-shed. Presumably at least one-half of this material emptied into the Atlantic Ocean and has been ever since hidden from view. A large part of the other one-half, however, stood a very good chance of being caught and deposited in the shallow sea of the Appalachian Geosyncline. Obviously the coarsest, heaviest, gravel would settle out along the foot of the mountains along the eastern part of the geosyncline. The rocks in this narrow sea reached the prodigious thickness of more than 40,000 feet in Pennsylvania and more than 18,000 feet in Alabama near Birmingham. You may question the possibility of accumulations of such thicknesses in a sea not exceeding 600 or 700 feet in depth. This is a legitimate question and will be answered in due time.

Near the middle of the Paleozoic Era, known as Silurian time, the Geosyncline evidently had very little sea water in it because the record of the rocks shows very clearly that the predominate type of deposit were characteristicly lagoonal. In these narrow shoestring-like lagoons there was deposited, under conditions which are not fully understood, considerable beds of a rock known as hematite. This rock is very high in iron oxide and is used

as the main ore of iron in Alabama and Tennessee. It is called "Red Iron Ore" or "Fossil Iron Ore." This same iron deposit was laid down in narrow lagoons all along the Appalachian Geosyncline from New York to Alabama, and a few scattered places along the western margin of the Silurian sea.

At the time of this iron ore deposition we may well suppose that the mountainous mass on the east was well worn down and that the geosyncline was beginning to show signs of filling. So, after the Silurian these gradational processes continued. Finally, Old Appalachia was reduced to near sea-level and the geosyncline was essentially filled. So full was it indeed that the closing events of its depositional history is recorded in swamp deposits alternating with those of brackish water and those of shallow seas.

This final depositional event is the one whereby our coal deposits came into existence. Because, as many of you doubtless know, microscopic examination of our bituminous coal shows it to be composed practically 100 per cent of various types of plant debris, leaves, spores, seeds, resins, etc. Indeed it is not necessary to resort to the microscope to find these plant remains. Alternating with coal seams we find marine rocks which tell us that the swamps in which the coal-forming vegetation grew was very near sea level and that from time to time the land rose, or sank, a few feet, causing the sea to retreat or advance. Each advance killed out the fresh water vegetation growing in the swamps and caused marine muds and sands to be deposited upon top of the vegetable matter. Given time and pressure on this underlying vegetable matter it has been converted into the coal we find all up and down the Appalachian region. These coal depositing events were among the last recorded in Alabama, and all of eastern United States for that matter, in the Paleozoic Era. Subsequent history is to be concerned with the unfolding details of the formation of the surface features as we now know them.

At the close of the Paleozoic Era, Old Appalachia was eroded down to near sea-level. The gigantic quantity of material contained in these old mountains, therefore, was shifted from its former resting place to places several miles removed. World-wide observation shows that the structure of the earth is such that it cannot withstand such tremendous shifting of burdens without a series of complicated structures being produced. As a result, the oceanic segment on the east developed a tremendous pressure due to its recent over-loading and then with mighty forces, far beyond our ability to reproduce in the laboratory, it pushed against the materials recently deposited in the geosyncline and were bent and broken as though they had been squeezed between the two jaws of a vise. This folding and breaking was a very slow process and was accompanied, of course, by constant erosion. These two factors working together have produced the present ridge and valley system of Alabama.

Mesozoic and Cenozoic History

Since the close of the Paleozoic Era, Alabama has been invaded by the sea six or more times. During these invasions the material which was swept off of the newly formed Appalachian Mountains was evenly distributed across that portion of the country which we now know as the Coastal Plain.

After the final retreat of the sea from Alabama, during which time the Citronelle formation was deposited, the present drainage system of the Mobile and Alabama Rivers was established.

The erosion action of Mobile River, plus the gradual rising of lower Alabama since the last sea retreat, permitted the carving of the present coastal indentation known as Mobile Bay. Dauphin Island and Mobile Point are sand deposits which the shore currents have deposited nearly across the mouth of the bay.

Conclusions

Thus, we have witnessed by means of a hurried and sketchy word panorama the essential outline of the geologic events which culminated in Alabama as we know it today. Man's utilization of the coal, iron ore, limestone, soils and waterpower constitute another thrilling story, but one which is outside the limits of this discussion.

Unexpected Discoveries

By JAMES COLEMAN FISHER

Quite often minerals are to be found almost under one's very nose with scarcely any previous suspicion of their proximity. In this connection I recall an incident of several years ago which occurred literally in my "own back yard." Having purchased a farm in Cheshire County, New Hampshire, we found it necessary to make repairs to the fireplace, which necessitated a quantity of white stone. Hoping to find some near at hand, we searched around a bit and sure enough, we located an outcropping of milky quartz on the top of a small hill just in back of the house. A shot of dynamite was set off revealing a most interesting spectacle. The outcropping proved to be part of a pegmatite dike cutting the porphyritic country rock. Milky quartz, microcline, orthoclase, muscovite, augite, tourmaline, and garnet all met the eye in a confused jumble. The pegmatite consisted chiefly of quartz and feldspar, occurring in large masses, only a few crystals of each being found. The augite and tourmaline crystals were scattered throughout the entire dike, splotching the mass with green and black respectively. Most of these crystals were poor, being delicately brittle, the fractured black tourmaline presenting the appearance of coal. Smaller, harder and more perfectly shaped black tourmalines occurred in the zone of contact between the pegmatite and the country rock, but no pink or green tourmalines have as yet been found.

Garnets also occur in this zone, as well as biotite, which was likewise disseminated in small scales throughout the country rock. The garnets, seemingly intergrown one into the other, were quite brittle and poorly shaped, only the tiny crystals showing the characteristic trapezohedron. The muscovite was plentiful, being found in plates up to eight or ten inches in diameter. Smaller but perfectly shaped hexagonal crystals were also obtained, many containing tourmaline inclusions. I managed to extricate one muscovite crystal which was two and a half inches in diameter and three quarter inches thick and so perfectly shaped that it alone fully repaid me for all the energy expended.

Another instance occurred to me also in Cheshire County about six miles distance from the pegmatite mentioned above. Having heard stories of a mine high up on a hill near Westmoreland, I tried to glean all the information possible before endeavoring to investigate. Consequently, I quizzed many of the natives, most of whom knew nothing about it, but could recollect having heard something, about some mine, somewhere. From several I learned it was a gold mine; others claimed it was iron; somebody else said chlorite. Putting two and two together, I finally concluded that undoubtedly there was a mine in these hills, but what mineral it contained heaven alone knew. I was rather intrigued however, and decided to find out for myself what kind of a mine it was.

Taking the average of all directions given me, I finally came upon the object of my quest late one afternoon after having spent most of the day looking for it. The first thing that met my eyes was a row of dump piles alongside an equal number of pits filled with water. Eager to learn the minerals contained in the dumps, I hurried forward to investigate. The first to be found was an encrustation of malachite and azurite. Next came pyrite in small but perfectly shaped cubes. Pushing on to the next pile, I came upon small broken pieces of fluorite and many quartz crystals. Perceiving an almost overgrown trail through the woods, I followed it hoping to be led to more fertile fields. A half mile further on I came upon the main workings and at once perceived that it was fluorite mine. Tumbledown buildings, broken machinery, and several waste piles were scattered around a large excavated vein about one hundred and fifty feet long by fifteen or twenty feet wide and about

thirty or forty feet deep, partly filled with water. This had been a solid vein of fluorite, long since exhausted. Several other small and partially worked veins were found nearby.

This locality proved to be very interesting, and I rumaged through every dump pile until I was forced by darkness to head for home, bearing several fine specimens of green, purple and colorless fluorite, a few clear rock crystals, and one or two specicmens of pyrolusite. Since this visit I have noted a reference to the locality on page 176 of U. S. Geol. Survey Bulletin No. 666 by E. F. Burchard.

Another time while in search of a cavern in which stalactites and stalagmites were supposed to be contained, we stopped in a ravine to cook our meal. While scraping away the leaves and pine needles, we happened upon several quartz crystals lying loose in the soil. Digging further in we found more loose crystals until we had unearthed nearly a potato bag full. This quartz locality has never failed to add many specimens of rock crystals at every visit, and though we dig in the hope of finding other minerals there, no other has yet seen the light. On one of our visits to this locality we were accompanied by an octogenarian farmer who also had a great interest in minerals. He insisted that we stop at his house which was nearby and see his collection, showing us on the way an outcropping of rose quartz. Arriving at his farm, we were surprised to see that he had his collection strewn about his front lawn in the form of monuments and mounds. He said he kept them there so that everyone who passed by could enjoy them.

This old man proved to be very interesting and he had several very good specimes, two of which I believe are worthy of mention. One was a fluorite crystal about four inches in diameter . . . a green octahedron with several faces modified by tiny cubes. The other was a group of rose quartz crystals . . . something which I had never seen before. However, he told me where he found them, and I hope soon to go myself in search of some.

Mule Spring, California—An Interesting Locality For Geodes, Jaspers and Agates

By WM. C. CHANDLER, *Chico, Calif.*

To reach the locality, take road east out of Barstow, San Bernardino Co., for about 27 miles until Manix Service Station, on Highway 91, is reached. Road turns north 100 yards west of the service station. Five miles north up this road is Jasper Hill. Note old foundation here where a rock crusher was installed a few years ago. Road follows wash to left (west) around hill and goes over a low ridge. Soon an old dugout is reached "Old Pony Express Stopping Place" and Mule Spring.

In the hill behind the dugout, chalcedony nodules have weathered out of their matrix and interesting specimens may here be collected. On the south slope of the same hill, some nice geodes may be found. East of here, veins of jasper and agate occur in the open flat wash of the low ridges. These agates and jaspers are very beautiful.

East of Jasper Hill, more chalcedony nodules, quartz veins, and calcite float are to be found and all within a half mile circle.

About 45 miles east of Barstow, on Highway 66, where Power Line (Steel Towers) crosses highway (6 or 7 miles west of Ludlow) nice specimens of float jasper and some odd pieces of petrified wood may be found.

Some Minerals of the Joplin, Mo. District

By TOM TARR

For a collector who is not well acquainted in Joplin or vicinity, it might be well to say that the proper procedure is to select the busiest appearing mill along the roadside and examine the waste rock pile. From it one may glean good crystals of dolomite, marcasite, calcite, occasionally galena and sphalerite, thus getting a better conception of their mode of occurrence than by first looking over nearby mineral stands.

Near the Carthage marble quarries, the rock piles have been weathering for some time and excellent small specimens may be obtained with little difficulty. Crystals of galena are found which break loose very easily from their crumbly marble matrix. They are in the form of either octahedrons or dodecahedrons. Their size runs from about ¼" to ¾". This is the only place in the district as far as I know where galena is found this way.

Sphalerite has a similar type occurrence in the southeastern part of Joplin city. There the dumps yield small but sometimes perfect dodecahedrons of sphalerite encased in chert. I have several very oddly appearing pieces of chert which were at one time loaded with crystals. Apparently these have dissolved away and left the chert looking as if it were covered with hieroglyphics. Some of the crystals found here are the clearest ruby variety I have seen, more like garnet than sphalerite.

Southwest of Baxter Springs, Kansas, occurs a sphalerite which has formed into shaggy black crystals. These are so scrambled that no definite name can be given to their form. A galena with an unusually bluish tint is mined at the same place.

Picher, Okla., boasts of calcite crystals that have phantoms outlined in marcasite. They are excellent scalenohedrons and often have a beautiful amethyst tinge. Evidently the crystals were halted at some time in their growth and a layer of tiny marcasite crystals deposited on them. Later a second deposition was made of calcite which was clear enough to allow the marcasite to be seen plainly even at a depth of an inch on some of the larger specimens. The internal crystals which are outlined are commonly different than the surface forms although the sides are easily recognized as perfect planes. Picher also has a variety of marcasite, recently discovered, which is highly prized because of its large fine crystals and their high gun-barrel blue sheen.

In a district by itself, Granby, Mo., is famed for its calamine, dendritic pyrolusite often occurring directly upon it. I have some extremely large and fine pieces of all grades of crystalline calamine. Granby has also some pseudomorphous pyrite, var. limonite, in dark brown cubes. One of my best calcite pieces from Granby has a dendritic pattern about ¼" below the surface.

Cerussite is a mineral of Joplin which is not very well known to collectors. I have a few choice specimens which are entirely crystalline. They are very rare in this locality. Barite is often mistaken for cerussite by the miners.

A collector should never miss the chance to loiter in this fascinating mineralized area just because his own hunting ground has some of these minerals. The Tri-State land continually yields new varieties which are not found elsewhere. These lead and zinc mines will be able to produce far more than the demand for their products for many years to come.

Chrysoberyl Near Golden, Colorado

By DAVID M. SEAMAN, M. S.

Eight miles northwest of Golden, Colorado, along the road to Blackhawk and Central City, there is a feldspar quarry located high up on the ridge along the left hand side of the road.

It is necessary to crawl under a barbed wire fence, cross a small mountain stream, and climb a short steep hill to reach the quarry.

Here in the quarry and on the dumps one may collect pink feldspar; hugh crystals of black tourmaline up to a foot long and three inches in diameter; books and plates of muscovite mica three or four inches thick and about eight inches across; much white quartz; a few small very much fractured, brownish-red crystals of apatite; a few small green and brown crystals of beryl; and quartz stained by copper solutions with also pyrite and brown garnet enclosed in the quartz.

The pegmatitic mass covers most of the ridge, being bounded by a layer about four feet thick of epidote, brown garnet, quartz-schist, and further away by quartz mica schist. In the zone next to the pegmatite, some crystallized epidote and brown garnets make attractive specimens.

Descending the ridge from the quarry and stooping down to get a drink of water from the mountain stream, I was suddenly attracted to a rock just in front of my eyes on the very edge of the stream. This rock showed a flat, tabular, brownish-green crystal about one and one-half inches long, three-fourths of an inch wide and three-sixteenths of an inch thick imbedded in a matrix of quartz, yellowish colored feldspar, and muscovite. I was very enthusiastic for I thought that it might be chrysoberyl. I searched along the stream bed and back in the quarry, but could find no more similar occurrences. Since then I have visited the quarry several times but have never found another chrysoberyl. The specimen must have been carried down by rain-wash from the quarry as there seems to be no other place from which it could have come.

The chrysoberyl was identified by chemical and optical tests (on small fragments) by Mr. Ernest Wahlstrom of the University of Colorado and by Mr. W. A. Copeland of Carnegie Institute of Technology. To the writer's knowledge, this is the first report of chrysoberyl being found in Colorado.

Down stream from the quarry and across a gully, a few prospect pits are to be noted in mica schist. Here the interesting mineral, sillimanite, is found sometimes in large nearly pure chunks associated with quartz, mica schist, and flattened and stretched black tourmaline crystals.

A visit to the vicinity of this quarry is well worth while for anyone interested in pegmatitic minerals. Then some one may find more chrysoberyl.

Recent Finds of Interest

One of our subscribers, Mr. S. A. Arbuthnot, of Berros, Calif, has sent us a peculiar and unusual specimen of petrified wood. It is apparently sandstone, very much pitted, and of a dull, brownish color. This particular specimen appears to be a piece of a trunk or limb with about 2½" of an offsetting branch.

Mr. Arbuthnot has found many of these specimens on the sloping sides of a sandy mesa, three miles from town, where they have been washed out by heavy rains. He regards them as being petrified oak.

The specimen sent us shows a diameter of 3" in the main trunk or branch; the offsetting branch being 2" in diameter. As a whole it is 5" x 5" and weighs 1½ lbs.

Third National Outing of the Rocks and Minerals Association—Sunday, May 19th, 1935

The Rocks and Minerals Association extends a cordial invitation to all readers of Rocks and Minerals, and to the general public, to participate in the Third National Outing. Members of the Association are urged, not only to be present themselves, but to bring their friends as well and otherwise advertise the outing.

Last year over a thousand persons attended the various field trips of the Rocks and Minerals Associaction's National Outing. Were you among them?

Why not attend this year and join this happy group. Aside from collecting minerals, this annual event will give you the opportunity to get together with old friends, and make many new ones, too. If you are just a beginner, here is your chance to do some collecting under professional guidance.

Perhaps you have some specimens for exchange, or specimens which you have never been able to identify. If so, bring them along.

All those planning to attend are requested to register with their respective directors. If an answer is wanted to a written inquiry, a self-addressed stamped envelope enclosed with the letter would be appreciated by the director.

If those having cars could accommodate one or more extra passengers, it would be considered a great favor if they would so inform their directors.

In order to obtain an accurate count of the total number attending the Outing, the directors will take the names of all present. Please co-operate by making certain that the director has your name included.

Except as noted, bring lunch.

NOTE—Please be careful around mines and quarries. Neither the Association nor the directors nor even the owners of property on which outings may be held will be responsible for any accidents incurred by those participating.

The states in which outings will be held and their directors are as follows:

CALIFORNIA

Director—C. A. Noren,, 810 Vassar Avenue, Fresno.

(Note—Please write to director for information. A choice of two very interesting trips is available, depending on how long a trip those desiring to attend wish to make).

CONNECTICUT

Director—Mrs. Lillian Otersen, 16 Grove Place, West Haven. Secretary New Haven Mineral Club.

Locality—Strickland Quarry, Collins Hill, Portland, Conn.

Meeting Place—9:00 A. M. at Peabody Museum, Whitney Avenue, New Haven, or 10:00 A. M. at the locality.

Specimens—Many interesting pegmatite minerals.

ILLINOIS

Outing will be held May 25th - 27th

Director—Ben H. Wilson, 112 Mississippi Avenue, Joliet.

Locality—A very extensive two-day field trip to include the study of rock formations, and the collection of both mineral and fossil specimens; in the tri-state district.

Meeting Place—Hotel Tracy, Platteville, Wisc., preferably the evening of May 24th.

(Special Note—This is a field trip sponsored by the Amateur Geologists Association of Chicago, to be held on May 25th and 26th. Dr. John R. Ball, Professor of Geology, Northwestern University, will be in charge. A registration fee of $1.00 is being charged to cover the expense of maps and bulletins which will be issued, and the field expenses of the leaders. Please register immediately with the chairman, G. Frederick Shepherd, 601 E. 102nd St., Chicago, Ill.

MARYLAND

Directors—A. Llewellyn Jones and W. E. Price, Natural History Society of Maryland, 2103 Bolton Street, Baltimore.

Localities — Hematite deposits at Lansdowne; gneiss quarry at Gwynn's Falls, Baltimore; McMahon limestone quarry near Bare Hills; and the old

copper and chrome mines, and serpentine quarry at Bare Hills.

Meeting Place—10:00 A. M., N. W. corner of Bolton Street and North Avenue.

Specimens—Hematite, epidote, garnet, pyrite, chromite, chalcopyrite, opal, deweylite, serpentine and many others.

MASSACHUSETTS

Director—John Kitson, 30 Briggs Street, Easthampton.

Assistant Directors—Prof. Benjamin Shaub, Technician; Mr. Anthony Kendrew, Registration; and Thomas Ryan, Transportation.

Localities—1:30 to 2:30 P. M. Showing of lantern slides of minerals photographed in natural colors by Prof. Shaub, of Smith College; Prof. Shaub will give a brief talk on each specimen. 2:40 P. M. visit to a lead and zinc mine at Loudville on the farm of Mr. Joe B. Schranz, located on highway route 66 by way of West Street, Northampton.

Meeting Place—1:00 P. M. at Nonotuck Hall, Clark Street, Easthampton.

Specimens—Plentiful. Quartz xls, barite, galena, sphalerite. As coatings, cerussite, pyromorphite, malachite, (rare) azurite and wulfenite.

(Note—Boy Scouts will be in attendance to co-operate with directors, will direct parking of cars and assist visitors).

MICHIGAN

Will be held on Saturday, May 11th, at Ann Arbor.

Director—A. F. Combs. Secretary Michigan Mineralogical Society, 15101 Penrod Avenue, Detroit.

Program—Meet at the University Museum, 2:00 P. M.

Dinner at the Michigan Union, 6:00 P. M. Basement of the Museum at 7:00 P. M., a demonstration of a furnace for testing and melting minerals. Museum lecture room at 8:00 P. M., a lecture "Gems and Gem Cutting" by Dr. Krause (author of several books on minerals and gems).

This is a joint meeting of the Michigan Mineralogical Society and the Ceramic Society.

NEW YORK—Albany Division

Director—R. R. Ritchie, Route 29, Saratoga Springs.

Localities—10:00 A. M.—12 M—"Petrified Gardens" near Saratoga Springs. After lunch, chrysoberyl locality in Greenfield; Mt. McGregor feldspar dike; tour of Saratoga Spa.

Meeting Place—10:00 A. M.—"Petrified Gardens," Route 29, 3 miles west of Saratoga Springs.

Specimens—Fossils, black tourmalines, and possibly a number of other minerals.

NEW YORK—Metropolitan Division

Director — Emmet Doherty, 1419 Crompond Road, Peekskill.

Locality—Franklin, N. J.

Meeting Place—11:00 A. M. at the Parker Dump. Take State Highway, Route 23, and turn west on High Street (Shell gas station is on corner), cross North Street and before you reach the railroad crossing you will find the Parker Mine dump on your left.

Specimens—Calcite, Franklinite, willemite, zincite and many others.

(Note—The New York outing is being held at Franklin, N. J. because it is the world's most famous mineral locality with the possible exception of its one rival, Langban, Sweden. A greater number of specimens are found here than anywhere else in America. Mr. James F. Morton, curator of the Paterson Museum, Paterson, N. J., will be in charge of the outing.

Mr. R. L. McCann, Superintendent of the Franklin mines, has been most cordial in granting permission for the outing to be held in Franklin and has also stated that it will not be necessary for members to bring lunch. Lunch may be obtained in Franklin at a lunchroom conducted by Bob Wilson on Main Street and at Miss Toolan's restaurant on the State Highway).

In the midst of these notices, which we hope will be read and acted upon, we wish to ask the directors of the various outings to send us brief reports of their outings for publication in the magazine. The number present, special finds and incidents will be interesting.

PENNSYLVANIA

Director—Joseph L. Gillson, President of the Philadelphia Mineralogical Society, 8065 du Pont Bldg., Wilmington, Del.

Localities—Hibblehouse road metal quarry, Perkiomenville; Perkiomen copper mine and Ecton mine, Lower Providence Township, Montgomery County.

Meeting Place—Philadelphia and Western Station, Norristown, Pa. 10:00 A. M.

Specimens—A large variety of both metallic and non-metallic specimens should be found.

RHODE ISLAND

Director—A. W. Quinn, Professor of Geology, Brown University, Providence.

Locality—Several interesting places in western R. I.

Meeting Place—9:30 A. M. Rhode Island Hall, George Street, Providence.

UTAH

Directors—Junius J. Hayes, 1148 E. 1st South, Salt Lake City; and Prof. Crawford, microscopist for the the Bureau of Mines at the University of Utah.

Locality—The great Utah copper mine at Bingham.

Meeting Place—at 8:00 on the lawn of the L. D. S. Business College at North Temple and Main Streets.

Specimens—A number of copper minerals.

VERMONT

Director—F. L. Parmenter, 51 Elm Street, Springfield.

Meeting Place—Adnabrown Hotel Springfield, Vt., 7:00 A. M.

Specimens—From pegmatite formation, write director for details as to locations

Each person to provide own lunch.

Fred W. Schmeltz, Photo (1931)

The Yuma Mine, near Tucson, Arizona. A mine famous for its excellent specimens of Vanadinite and Wulfenite

Collector's Kinks

Collectors are cordially invited to submit notes from their experiences and so make this department of interest to all.

Those using block mounting for their specimens. If the minerals are to be mounted solidly on the blocks, it can be done very simply as follows: Clean the specimen on the base with alcohol or gasoline and allow to dry thoroughly. Then if the mineral is an opaque one, the mounting can be done with a cement variously called "Metallic X" "Metallic Solder" and other trade names. It is all practically the same cement and holds so strongly that often the mineral will break before the cement if the specimen is pried off. If it is desired to remove it, it is necessary to soak the cemented portion in Xylol for at least a half hour to soften it. Transparent specimens can be cemented in the same manner except using a transparent cement manufactured by Duco Co. The former has a silvery color that would not go with a transparent specimen but the latter is colorless. These two cements can be purchased at Woolworth's and the Xylol can be purchased at any drug store. Xylol in its commercial form goes under the trade name of "Nacto" and can be purchased in some places as a cleaner. **Caution:** Do not put organic specimens in Xylol. Xylol dissolves pitch, tar, rosins and other organic material.

C. W. REITSCH.

Mineral Oddities

Did you ever see a piece of petrified wood attached to another formation? As well as I can recall, nothing like that occurs in the Petrified Forest of Arizona, nor in the one at Florissant, Colorado where some of the world's most unusual specimens are found. In the Front Range south of Colorado Springs however, is a replacement of some sort attached to a block of Cretaceous sandstone weighing probably 300 pounds or more. It looks as if a round piece of stove-wood about 3 inches thick had been driven partly through the rock and permitted to petrify there. The stick is highly agatized showing bright colors from red through brown to ivory.

Usually petrification in the Cretaceous formation in Colorado consists of a very low state of replacement through silication, thereby producing little or no color and leaving the fibre of the wood much as it was in life with slivers and bark in place. But this piece is like the highly agatized and flinty variety found in the Carboniferous formation in which pitch-black and pure-white specimens are common, and the texture has become solidified, the subject losing its identity except through general form or shape.

F. C. KESSLER.

Canon City, Colorado.

MINERALOGY QUIZ

(Answers on Page 79)

1. Where is Magnet Cove?
2. Name one interesting mineral found there?
3. What is the most advertized Arkansas mineral?
4. What green, radiating mineral is found in Montgomery Co., Ark.?
5. What precious gem of America is mined only in Arkansas?

The Amateur Lapidary

Conducted by J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones.* A practical guide-book written in non-technical language for those who desire to cut and polish semi-precious stones.

Construction of the Diamond Saw

The diamond saw is usually constructed of bronze or spring brush copper, though harder materials may be used. Any material for such a saw should be quite malleable.

Obviously the softer metals can be worked more easily and will also kink and bend more readily; however, a saw constructed of such materials will cut faster. Saws made of harder materials withstand rough usage better and may be expected to last longer between charges, but they require more force in the charging process and will have a slower cutting rate. Personal preference is for saws of the softer metals since faster cutting is the main reason for using such saws.

To properly charge a diamond saw requires some patience and a bit of skill. The object is to evenly distribute and securely imbed in the saw's rim an adequate amount of moderately fine diamond dust. One-third to one-half carat will be sufficient for an eight inch twenty-two gauge saw. The metal disc selected for the saw should be flat and a perfect circle before starting the charging process.

Nick the prepared disc all around with a thin knife blade or old safety razor blade having an improvised handle. If the edge of the blade is delicately beveled to a cold chisel angle the annoyance of its breaking will be avoided. The narrower the slits the easier to close them later on. Preferably the little nicks should be no farther apart than the thickness of the saw and scarcely any deeper. The closer together they are placed, without chipping out any material, the better. Place the slits regularly and of even depth.

Mix the diamond dust with four or five drops of olive oil or other oil of similar consistency. Spread the mixture evenly on the nicked rim with a splinter of wood, or better, a metal point, as it will not absorb any of the mixture.

Now put the saw on its shaft, placing somewhat smaller heavy sheet metal discs on both sides of it for added rigidity. The saw is now slowly turned, usually by hand, against a metal roller. For the roller an old wheel dresser may be fitted with a round section of hard steel having about a one-eighth inch rounded groove about its center.

The rolling further distributes the diamond dust, closes the slits and thickens the rim, thus providing the necessary clearance. If the saw is of rather hard material light hammering may be interspersed, advisedly, with the rolling. However, steady even pressure should be applied with the roller, sufficient to gradually develop a rolled rim but not enough to kink the saw. When the roller is slightly advanced, if it be clamped so it cannot recede, it will develop the most accurate circle. When the nicks have all disappeared, the rim appears smooth, and is about double the original thickness, the job is done.

There are other technics for constructing a diamond saw, but this method will evenly distribute the diamond dust, firmly secure it in place, and maintain the saw in a true circle ready for work.

DR. H. L. SAYLER,
927 Clinton Ave., Des Moines, Ia.

NOTE—Dr. Sayler in answer to an inquiry admits that the rim should be 50 per cent thicker than the metal of which the saw is made. I believe this is more thickness than most of us are using and would like to have opinions from others as to how much "set" should be given the saw. J.H.H.

Bibliographical Notes

The Story of Diamonds

By A. C. Austin and Marion Mercer.

Prepared for the Century of Progress Committee of the Chicago Jewelers' Association, Chicago: R R. Donnelly & Sons, 1935, Pp. 90; illus. 125. $ .50.

A Century of Progress has closed and like all International Expositions of this sort may be evaluated in many ways. Those fortunate enough to visit a World's Fair remember the achievements and progress of civilization as demonstrated by the displays, but of more permanent value are the tangible products perpetuated through literature.

Many exhibitors at A Century of Progress published "The Story of" their products. Thus we have the stories of salt, figures, steel, coal, meat, and many others.

The amateur geologist can find among these bookets few of such interest and value as "The Story of Diamonds." Messrs. Austin and Mercer, who managed the Diamond Exhibit at Chicago's World's Fair in 1933-34, have just published this excellent treatise on diamonds illustrated with photographs of many of their exhibits and supplemented with a wide selection of original photographs furnished by the diamond mining people of South Africa.

In this booklet the nature and properties of diamonds are discussed, bringing out in addition to the "stereotyped" properties, their relationship to the value and use of the diamond. For example, the power of dispersion in the diamond is not only that property which separates light into its component parts, but also is one of the contributing factors to the great beauty of the stone.

The second and third chapters, dealing with occurrence and geology of diamonds, give an historical account of the earliest known recognition of diamonds, followed by a geological treatment showing the volcanic origin of the diamond-bearing rock. The geographic distribution of the diamonds is illustrated by a pictorial map showing the annual production of diamonds from various fields and the few places where diamonds are cut.

Methods of mining and milling of diamonds and the art of cutting and polishing the gems are described and excellently illustrated. In this same booklet one will find the descriptions of, and the romantic stories connected with, most of the great diamonds of history.

One will not read this booklet without becoming aware of the fact that half of the diamonds produced are used industrially, and the many commercial uses to which diamonds are put are pointed out.

The book closes with biographical accounts of some of the men whose names are associated with the rise of the great diamond industry, foremost of whom is Cecil John Rhodes.

G. FREDERICK SHEPHERD
March 30, 1935

Club and Society Notes

Maine Mineralogical and Geological Society

The Maine Mineralogical and Geological Society is making an aggressive campaign to enlarge its membership and to create a wider interest in Maine's minerals. As an inducement they are offering to senior members 12 labeled specimens of the better known minerals of Maine and to the junior members a box of 10 labeled specimens. The senior dues are $2.00 a year; the juniors are expected to pay 50 cents.

It would not be in accordance with the policy of ROCKS and MINERALS whose very purpose has been from the first to encourage a broader interest in mineralogy to do other than wish the Maine Mineralogical and Geological Society every success in this enterprise. We have many Maine subscribers and we would invite them to join in this effort to awaken a keener interest in the minerals of their own state. We trust, however, that we shall not lose these subscribers from our mailing list but that the new members of the Maine Mineralogical and Geological Society will also become members of the Rocks and Minerals Association by subscribing to ROCKS and MINERALS. A greater interest will be developed in the study of the minerals of their own State as they seek knowledge of the minerals of other states and countries.

Good luck to you, Maine Mineralogical and Geological Society! May you increase your membership far beyond your expectations.

Benj. B. Burbank, Editor of MAINE MINERALS is president of the Society; Frank F. McKay, 35 Surrender Street, Portland, Maine is secretary.

Easthampton (Mass.) Boy Scouts

Troop 205, of Easthampton, Mass., sponsored by Nonotuck tribe of Red Men, under the leadership of Scoutmaster John E. Kitson, Sr., has presented to the science department of the Maple Street School a collection of local rocks, minerals and fossils from the collection assembled by the troop members as the result of mineral expeditions. These have been arranged in cabinets and have been catalogued by Elliot Andrews and Lawrence Mutter, members of the troop, and pupils at Maple Street School. The collection contains a specimen of the rare mineral, babingtonite, found some years ago on Mt. Tom; tourmalines from Goshen; garnets from Plainfield; zinc ore from the Loudville mines; datolite from Westfield; beryl from Chesterfield; and fossil fish from Sunderland. Two years ago the troop presented a similar collection to the children's department of the public library.

Department of Mineralogy Natural History Society of Maryland

The Department of Mineralogy of the Natural History Society of Maryland meets once a month at the headquarters of the Society, 2103 Bolton Street, Baltimore. The aims of the organization are concerned with the minerals native to the state of Maryland. They are: (1) To form, prepare and exhibit, a complete and representative collection of; (2) to form a check and study collection of; (3) and to discover and compile information relative to: those minerals native to Maryland. To that end they carry on an extensive program of field work and research, and they have already published several reports on their findings and it is their intention to publish more in the future. The Scientific Staff of this department is composed of Mr. Llewellyn Jones, curator; Mr. Walter E. Price, assistant curator; Mr. Charles W. Ostrander, treasurer, and Mr. L. Bryant Mather, Jr., secretary.

THE INSTITUTE OF QUARRYING (England)

For the 17th Annual Conference—June 17th to 20th inclusive—at Buxton, Derbyshire, England, the Institute of Quarrying is endeavoring to arrange a World's Congress of Quarrying in conjunction with the Conference. Invitations have been sent to many organi-

zations in different parts of the world to attend the congress, and a large number of delegates from U. S. A., Germany, Belgium and Norway will be present.

The object of the Congress is to have an all-around discussion on methods used in quarrying in the hope that one country can benefit from the experience of another.

Arrangements will be made for delegates from abroad to spend the week following the Conference visiting large quarries in England and Wales.

A cordial invitation is extended to members of the Rocks and Minerals Association to attend the Conference. Further information may be obtained from S. McPherson, Gen. Secretary, The Institute of Quarrying, Salisbury Square House, Salisbury Square, off Fleet Street, London, E. C. 4, England.

Acknowledgments

We wish to acknowledge receipt and express our sincere thanks for specimens and other donations recently sent us by some of our subscribers.

Allison Albee, Rye, N. Y., three photos of two old iron mines in Putnam County, N. Y.

C. L. C. Bourne, Georgetown, British Guiana, a copy of "Georgetown Botanic Gardens Illustrated Guide (1934)."

Ronald Ives, Boulder, Colo., a large number of interesting photos of Colorado mines and mineral localities.

Richmond Myers, Bethlehem, Penn., a very good specimen of Carnotite coating Pottsvile conglomerate from Mauch Chunk, Pa.

Karl Proctor Perry, Hartford, Conn., a nice specimen of Soapstone, with an imbedded cube of pyrite.

David Seaman, Pittsburgh, Pa., 5 photos of Colorado mineral localities.

George Stifle, Georgetown, Calif., a small vial of minute colorless grossularite garnet crystals from California.

Stone Studio, Peekskill, N. Y., two large and finely polished specimens—Orange calcite and graphic granite—both from New York.

R. H. Van Esselstyn, New York, N. Y., 14 dainty little emerald crystals from Colombia.

James Watson, Bartlesville, Okla., one large and two small, very fine crystallized specimens—chalcopyrite on dolomite, from Oklahoma.

Personal Greetings

We are always pleased to meet our friends when they are traveling this way. Among those who called on us recently were:

Mr. and Mrs. Allison Albee, of Rye N. Y.

Miss Barbara Anderson of Lynbrook, L. I., N. Y.

Rev. F. E. Bogner, Hoboken, N. J.

Fred H. Detmer, Port Chester, N. Y.

Lewis C. Eichner, Bloomfield, N. J.

R. W. Gastmeyer, Maplewood, N. J.

Mrs. William T. Holt, Port Richmond, N. Y.

Katherine H. Mawhinney, New Rochelle, N. Y.

John C. Thornton, Royal Oak, Michigan.

MINERALOGY QUIZ—Answers

(Questions on Page 75)

1. In Arkansas.
2. Lodestone.
3. Rock Crystal.
4. Wavellite.
5. Diamond.

Reader's Section

Editor "R. & M."

For some months I have planned to prepare a short article on the "Petrified Gardens" near Saratoga Springs because of their unique appeal to anyone interested in the materials from which the old Earth is made, then, along comes the April issue of ROCKS and MINERALS with the announcement of the annual outings of the National Rocks and Minerals Association in the various States on May 19th and the naming of these "Petrified Gardens" as the place of meeting for some of the members of the New York State group.

I felt like writing at once to Editor Zodac and congratulating him upon this happy selection of a place for the outing. The property is owned and has been developed by Mr. Robert R. Ritchie, a genial Scotch engineer, and his professional wife, and they have had as visitors, some thousands of people from every corner of the world in the last couple of years. Amongst these visitors have been various geological associations and museum officials and some notable foreign paleontologists and scientists from related fields of research. At Ritchie Park, the members who are able to attend this outing, will find themselves able to walk but a few steps, from well-equipped picnic grounds with facilities for broiling meats and spending a pleasant day under the trees, to the seashore—yes, the seashore, where one is able to stroll along three reefs at different levels and view hosts of sea-cabbages, "dawn flowers" they have been called, the first plant life on the globe. But the sea beside which you may stroll is the Cambrian Sea and you have only to close your eyes and hear its roar, preserved now in the sighing of the giant pines of this plateau which now looks out over the basin of the old sea, stretching before the eye over a mile below and eastward, for this arm of the ocean washed the eastern and southern base of the ancient Adirondack land and the great stores of minerals which it contained now bubble up in the springs of America's greatest Spa, Saratoga. These plants grew on these coastal reefs six hundred million years ago, so that you could scarcely select a more ancient place in which to hold a meeting for a group of persons, interested even as amateurs. The smaller specimens take a fine polish like black ebony, and where the streaks of sandstone intermingle with the grey limestone the effect is like a rare onyx. I have had one specimen polished at the Stone Studio, Peekskill, N. Y., where you will find, incidentally, excellent polishing and related craftsmanship by Mr. Emmet Doherty and his charming wife. So, by all means try to attend this annual outing and get acquainted with the ancient Cryptozoon reefs by the Cambrian Sea, with the hospitable Mr. and Mrs. Ritchie and with the members of the Rocks and Minerals group.

Members should stop in Saratoga to see the Catholic Shrine near the race track. Mr. Ritchie constructed this shrine, using cryptozoons in most unique arrangement, and the sight is alone worth the trip.

DR. CLINTON P. McCORD.
Albany, N. Y.

John C. Pohl, one of our valued subscribers, and who resides at 204 N. 10th Street, Easton, Penn., is a lecturer of note who has presented many interesting talks on minerals. His method of awakening an interest in minerals is rather unique. A small portable miniature stage, made expressly for the purpose, is placed back of a curtain. The miniature stage is well lighted and an attendant keeps changing the settings while Mr. Pohl is delivering the lecture and showing the minerals as tableaus.

On the observance of the 25th anniversary of Boy Scouting in America which was conducted by the Delaware Valley Area Boy Scouts of America, at Easton Senior High School, Mr. Pohl was presented with the Silver Beaver Award, the highest honor which can be paid a civilian by the Area Council. The award was in recognition of Mr. Pohl's service to scouting.